UAS Project Office Undergoes

RQ-7B Shadow Unmanned Aircraft System (UAS)

The Army's Unmanned Aircraft Systems (UAS) Project Office (PO) is one of the Project Manager Offices under the Program Executive Office, Aviation and is organized to provide a comprehensive management and technical approach to the life cycle of the overall Army UAS fleet. This approach includes development, acquisition, testing, integration and logistics requirements for the Army's unmanned aircraft fleet. UAS directly supports the core mission of Army tactical commanders by providing near-real time, highly accurate reconnaissance, surveillance and target acquisition (RSTA).

Last fall, UAS PO participated in the Network Integration Evaluation (NIE) 12.1, which is designed to increase combat readiness and effectiveness. The second of the semi-annual field exercises evaluates deliberate and rapid acquisition solutions and integrates and matures the Army's tactical network. The first generation of Army UAS focused on building the core of the program and increasing reliability. The second generation focused on mission acceptance and expansion. The third generation is about autonomy, smart machines and network capabilities whereby machines provide the information and humans make the life-and-death actionable decisions.

Traditionally serving in RSTA roles, UAS has expanded its mission to include manned/unmanned teaming (MUMT), interoperability and aerial communications relay. Unmanned aircraft have become the critical link that ties together the Army's aviation, intelligence, communications and maneuver communities. With this newfound notoriety comes great responsibility, requiring a continued diligence in providing our soldiers the most technologically superior UAS equipment in the world. Participation in NIE 12.1 provided the opportunity to test out new technologies as

U.S. Army

Network Integration Evaluation

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well as refine those currently fielded to our forward-deployed forces.

UAS PO continues to modernize the Army's UAS fleet from the inside out, diligently working with industry partners to develop and install cutting-edge unmanned aircraft technologies. As described on page 33, UAS PO conducted a large-scale exercise, Manned Unmanned Systems Integration Capability (MUSIC), to prove technologies that are thought to be ready for fielding, such as MUMT capabilities, as well as run through interoperability profiles (IOP) designed for the express mission of handing off controls from unmanned operators to manned pilots. The technology piece that allows this transference of control is the One System Remote Video Terminal (OSRVT).

One example of the UAS Project Office's NIE participation has come in the form of providing OSRVT systems support and training to units operating in the exercise. NIE has become a proving ground for new concepts and discovery of gaps in current capabilities. To that end, OSRVT has been integrated into the NIE not only to provide soldiers on the ground with the existing capability to receive UAS video/telemetry for improved situational awareness but also to evaluate future OSRVT logistics and technical concepts.

In June 2011, the Department of the Army designated OSRVT as an official program of record (POR). As a part of the POR process, the OSRVT will be trained/issued to Army units per a predefined fielding structure (as opposed to the previous wartime method of in-theater distribution based on urgent soldier needs). The UAS PO has used the NIE as a pilot program for this new structure by fielding a POR quantity of 18 OSRVT systems to an NIE brigade combat team (BCT) and providing training to the unit as the equipment was issued. UAS PO provided an initial training team and a full-time field service representative to ensure that the troops have the support they need to accomplish their mission. The training team provided on-site training to 53 soldiers participating in the NIE.

Technically, the NIE is being used to evaluate the existing network output capabilities of the OSRVT and gather requirements for potential future enhancements. The systems have been placed in tactical operations centers of the mine resistant armor protected ground vehicle. With OSRVT, soldiers receive critical information about the location and composition of potential threats as full-motion video streamed from an unmanned aircraft. With this information, soldiers gain a visual reference of where the target is in relation to their position. In addition, the OSRVT can be utilized in a limited manner to stream situational awareness information across the network to other troops that lack the benefits of OSRVT. NIE's use of the OSRVT in this manner as a receive/dissemination node should provide beneficial feedback for future enhancements that expand its benefits to the forward-deployed forces.

One of the key elements in the Army's network modernization plan is the ability to dramatically extend the range of wireless networks using unmanned aircraft. In support of this, a Raven-based communications relay was implemented as a collaborative effort between AeroVironment, General Dynamics C4 Systems and UAS PO. With support from Program Executive Office Integration, this technology was evaluated for its ability to enhance and strengthen the network connectivity of the company commander and those of subordinate rank.

U.S. Army

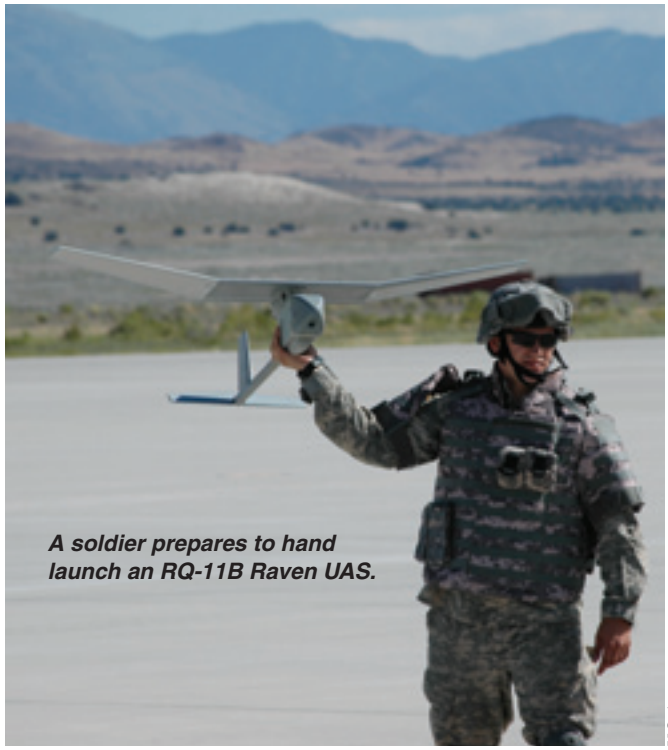
A soldier receives live video feed via the One System Remote Video Terminal, a new and recently tested technology that allows the transference of control from unmanned operators to manned pilots.

The Raven UAS by AeroVironment and Joint Tactical Radio System's handheld, manpack and small form-fit (JTRS HMS) radio, by General Dynamics C4 Systems, were integrated and flown in support of missions at NIE 12.1. The Raven, a hand-launched, back-packable, small UAS, was equipped with a JTRS HMS communications payload. The small size of JTRS HMS radio and extraordinary advances in wireless network communications enabled by the Soldier Radio Waveform (SRW) made this possible. SRW is a mobile ad hoc networking waveform that allows users to communicate beyond the normal constraints of line-of-sight radios by creating, in this case, airborne network nodes. Early results indicate that tripling the range of the standard ground-to-ground communications link is quickly achievable. Given that there are hundreds of Raven systems currently deployed by the U.S. Army in theater, adding an HMS radio to the Raven could put it well on its way to providing mission-critical communications and network information right down to the dismounted infantry squad.

Supporting the NIE 12.1 is the 2nd BCT, 1st Armored Division (AD). Organic to the 2/1 AD is a platoon of Shadow UAS, which is used primarily for RSTA capabilities in standard configuration but for NIE 12.1 was configured to serve as an aerial communications relay and to provide UAS video to the dismounted soldier. The communications relay radios normally used in the air vehicle to perform single-channel ground and airborne radio system (SINCGARS) retransmission were replaced with the PRC 154 Rifleman Radio, which can provide "network thickening" of the SRW for ground units. Using the Shadow as communication relay node, fitted with components capable of relaying/routing the SRW, can extend ground communications. The range extension is used to increase the range of the terrestrial network as well as to provide command-and-control messaging between supported units and the UAS operators.

In addition to the range extension capability, one of the radios in the Shadow air vehicle was used to disseminate video via SRW. The video was received on the ground using a Rifleman Radio attached to an android tablet running a video player. This was performed as a technology demonstration and was not employed by the soldiers. In future NIEs, this could be employed to demonstrate direct dissemination of video to the dismounted soldier.

According to Todd Smith, Deputy Product Manager, Ground Maneuvers Product Office, UAS PO, "Shadow's primary mission has long been reconnaissance and surveillance. NIE allows us to demonstrate the value of Shadow as a communications relay asset and the ability to experiment with data communications over JTRS out to supported ground units." Shadow testing is facilitating the move from legacy, analog waveforms such as frequency modulation/SINCGARS to digital waveforms such as SRW. This will allow and support the transfer of data from the sensor to the soldier, networking our units through an aerial layer. ★



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A soldier prepares to hand launch an RQ-11B Raven UAS.

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